TITLE: COMPUTER BASED INTEGRATED TEXT/GRAPHIC DOCUMENT

ANALYSIS

Related Applications:

This application is a continuation-in-part application

to U.S. Provisional Patent Applications SN. 60/282,078

filed April 6, 2001 and SN. 60/246,015 filed November 6,

2000.

Background:

The present invention relates to computer-based

systems for retrieving, displaying, managing, and analyzing

electronic documents that include text portions and

drawings or graphic portions. One class of such documents

includes patents and published patent applications of the

U. S., W.I.P.O., other countries, and territorial patent

offices of the world. As is commonly known, a vast number

and all future such patents and published patent
applications are available on-line for computer retrieval
from publicly available government and commercial databases
and from disks supplied by various entities. Typical users
include government patent examiners, patent attorneys and
agents, engineers, scientists, inventors, corporations,
government agencies, universities, technology and searching
services, and laboratories, and other individuals
interested in obtaining and evaluating such documents.

Various present day database management entities
provide server and PC resident software facilities to aid
the users to search for, find, and download specific
patents or candidate patents for analysis. Users can
undertake manual, Boolean, patent number, assignee,
inventor name, invention class and sub-class and many other
types of searches.

Once a patent examiner or other user accesses and
displays a candidate patent, user usually needs to quickly
read and understand the content of the document disclosure.
Often times the published abstract is insufficient to
convey the detailed information required for particular
tasks thereby forcing the user to scroll through the
specification and drawings for content. However, a
technical problem exists with present systems in that they

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lack the ability to integrate the textual information with the drawing information thus slowing the users efforts and increasing the user's analysis time.

Summary:

It is a principal object of the present invention to provide a programmed computer system and method that effectively displays, in a flexibly user managed manner integrated document text/graphic subject matter for user's rapid understanding of that subject matter.

Another object of the present invention is to solve the foregoing problems by computer analysis of the graphics and text information of an electronic document and present precise integrated text/graphic information to the user on the specific component, components, or functions of interest to the user and enable user to manage the integrated display of such information.

Another object of the present invention enables user to control the modes of computer presentation. For example, user can designate integrated text/graphic display on the computer monitor of precise drawing segments that include a user designated component and precise text segments that include the same user designated component.

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Alternately, the system can display on the monitor full figures of or drawing segments of a user designated component and the system can use synthetic speech software to "speak" the text segments that include the same user-designated component or functions or processes. In this latter mode, user can concentrate on the graphic information while listening to the text description of the structure and/or operation of the same graphic information.

Another principal object of the present invention is to solve the above mentioned problems and provide a system and method that not only integrates the text and drawing information for simultaneous display of both text and drawing information but also manages the text/drawing display of the precise component, components, or functions of user's interest while omitting non-relevant data from the integrated graphic display and text display and/or audio.

Exemplary embodiment of the present invention includes using the software-based system disclosed in U.S. Patent Application SN. 09/541,182, filed 04/3/00 by the assignee hereof to semantically process the natural language text into subject-action-object (SAO) structures. Since all S's (subjects) and O's (objects) are nouns, or noun groups, (hereafter jointly and severably noun groups) many noun

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groups in a given patent disclosure would be associated with and include a reference number in the text that, of course, corresponds with the reference character shown on one or more drawing/Figures. For example, it has been found that the semantic processing by the system of the aforementioned patent application identifies a noun group in U.S. Patent No. 5,974,616 as "sound chamber **19**" and not simply "sound chamber". In addition, the system can identify alternate text names given in the patent text for the same component for more reliable display or audio of pertinent information.

According to principles of the present invention, an exemplary embodiment includes a reference number recognition software module to recognize and identify those reference numbers in respective drawing sheets and their respective X-Y grid locations and an index linking each reference number with the respective number of each subject (noun group) and each object (noun group) in the text. Since the linking index bilaterally associates the drawing reference number to the noun group in the text, user can quickly display the precise text and patent drawing graphic by selecting either the number in the drawing or the noun group text segment as more fully described below. Because the noun group is recognized by the processing software,

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the noun group words can be highlighted to aid the user to quickly find and/or understand the content.

An exemplary embodiment of the inventive system enables a user to call up, download or otherwise access a document or documents, such as one or more U.S. issued patents. The system processes the document to generate the index that includes bilateral links between all text phrases that include reference numbers and all drawing segments that include the same respective numbers. User can scroll through the text and click on/select any numeric reference character (hereafter reference number) in the text. The system then automatically displays the segments of drawings that include that reference number. Also, it is preferred that, either automatically or by user selection, all sentence segments or phrases containing the reference number and/or the word(s) associated with the RN throughout the patent are also displayed so that the user can quickly read the various phrases while looking at the displayed drawings segment(s). As mentioned above, user can also select (click on) a "speak" button which will activate computer speech module which "reads" and "speaks" to the user the text segments over the computer speakers while user concentrates on the drawings. In addition, an "Expand" button can be selected by mouse or voice

recognition which will cause the system to display and/or "speak" a given number of words or sentences before and/or after the displayed and/or "spoken" text segment.

Another aspect of the system enables user to display and scroll through the drawings, then enter a reference number or click on a displayed reference number or alternately the associated noun group. The system then displays all or at least one drawing segment(s) and all or at least one text phrase(s) that includes the selected number or noun group. If desired, clicking on a specific displayed text segment, can display the full text including from several lines before to several lines of text after the selected text segment, which text is then scrollable under user command throughout the text document as described.

Other features of the invention include (i) enabling the user to "zoom in" to omit non-relevant or "zoom out" to include more relevant drawing information, (ii) identifying the drawing sheet number and X, Y coordinates of the displayed drawing segment, (iii) displaying the sheet number, Figure number of each segment, (iv) and providing a link from a displayed text phrase to the full text segment (paragraph) with forward and back text scrolling capability

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through the entire displayed patent text, (v) expand or reduce the text window and graphic window sizes.

A further feature of the present invention includes processing large numbers of documents and storing the relevant data of these documents in an indexed knowledge base to support a local or an on-line service or capability. Users accessing the system (either locally or on-line) shall have the above process features available for documents, such as patents, previously processed and stored.

An alternate embodiment simply identifies and stores in a linking index the text locations of each reference number and related noun groups and the drawing location of each reference number. User can select (highlight) or enter a particular reference number from a displayed text segment and the relevant drawing segment(s) will be displayed or user can select the number in a displayed drawing and the system will display all the text segments that include such number. In either case, selection of the text segment initiates display of a larger text segment fore and aft of the reference number, which larger text segment is scrollable by user command. This embodiment, with little or no semantic processing to identify the noun groups, is less effective in identifying the noun groups or

synonyms associated with the reference number and may not

identify the noun group unless the textual noun group

contains the reference number. Noun groups that do not

contain a reference number may be missed. Nevertheless,

this embodiment enables text – drawing displayed

integration to some degree.

Yet a further optional feature of the present

invention is a system of the type described in which a list

of all components (e.g. noun groups) including respective

reference numbers is displayed initially alone and/or

together with a text window and/or the graphics window. In

one example, the list is arranged in order of reference

character or alphabetical by noun words. User can change

the parsing rule by clicking on an icon. The component

list window, the text window, and the graphic window can be

expanded or narrowed as desired under user control to

provide less or more area for the other window or windows.

The component list quickly reveals to user all the

components (noun groups) in the text and drawings that the

systems associates with reference symbols. User can

quickly select, click on, the component user is interested

and, in response, the system displays in the text window

the text segment and, preferably, the text fore and aft of

this segment. The system then provides a number of ways

for user to select either text segment or component list
component to display the graphic segment that includes the
reference number of interest.

Drawings:

Other and further features, objects, and advantages of
the present invention shall become apparent with the
following detailed description of exemplary embodiments
when taken in view of the appended drawings in which:

Figure 1A is a computer monitor showing approximately two
paragraphs from U.S. Patent No. 2,974,616 which text and
related drawing shall be used to illustrate various
exemplary embodiments and features of the present
invention. It will be understood that the full text of the
patent is scrollable (not shown) and managed as described
below.

Figure 1B shows one example of tagging each text word with
a unique identifier (ID), which is internal to the computer
system and not displayed to the user.

Figure 2A is a diagrammatic representation of a linking
index or table within the computer system according to the

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principles of the present invention. It should be understood that this index does not physically exist as such but instead is a functional representation of interactions among programmed data bases and files and routines embodied in the computer system.

Figure 2B is one example of a flow diagram for user operation of the method here of involving users PC processing of the subject document.

Figure 2C is similar to Figure **2B** for a remote server processing of the subject document.

Figure 2D is a more detailed flow diagram of processing the subject document information into a functional linking index.

Figure 3 is one example of a screen shot displayed when reference number "**18**" is entered into window **34** of Figure **1**A or selected (clicked on) from text by Figure **1**A.

Figure 4 is similar to Figure **3** when anyone of "Sheet **1**" of Figure **3** is selected by user.

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Figure 5 is similar to Figure **3** when "sound chamber shell **18**" of Figure **3** is selected by user.

Figure 6 is similar to Figure **5** when "sheet **1** Figure **3**" of Figure **5** is selected by user.

Figure 7 is similar to Figure **3** wherein user selects sheet **1** and removes **18** from box **34** to hide text related to reference numbers.

Figure 8 is a pictorial representation of the data resulting from user selecting "**19**" in Figure **3**, hereof.

Figure 9 is similar to Figure **8** in which user selected sheet **1** in Figure **8**. Links to full text are represented by arrows A.

Figure 10 is schematic representation of a typical system for implementing the present invention.

Figure 11 shows one example of the main stages of a speak module for "speaking" text portions.

Figure 12 shows a screen shot of yet a further exemplary embodiment according to the principles of the present invention.

Figure 13 shows a screen shot similar to Figure **12** after "16" in window **68** of Figure **12** was selected.

Figure 14 shows a screen shot similar to Figure **13** after the underline noun group of window **82** was selected.

Figure 15 shows a screen shot similar to Figure **14** after the text noun group highlighted in window **70** was selected and sheet #**1** was selected by user.

DETAILED DESCRIPTION OF EXEMPLARY EMBODIMENTS

A glossary appears at the end of this detailed description.

An exemplary embodiment according to the principles of the present invention will now be described. Actual text and drawings from an actual patent shall be used as one example to illustrate the principles and power of the present invention.

A typical apparatus for implementing the present invention is shown in Figure **10,** that includes a general

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purpose computer system **10** with CPU, memory, etc. suitable

data entry and user interface devices such as disk reader,

keyboard, mouse, scanner, voice recognition, etc., a modem

or other communicating device, a monitor and printer, and

other standard devices (internal and external) as desired.

System **10** can be programmed to implement the inventive

method hereof or access a remote server programmed to

enable user and other users to implement the present

method.

One example of the present process and apparatus shall

be described using two paragraphs of U.S. Patent No.

5,974,616 as shown in Figure **1A**. It will be understood

only two paragraphs are being used for simplicity only and

that, indeed, the entire patent is processed in the actual

system.

In one preferred exemplary embodiment of the system

and method of the present invention, the text of Figure **1A**

is preferably, but not necessarily, semantically processed

according to the principles of the system and methods of

U.S. Patent Application SN. 09/321,804 filed May 27, 1999

and U. S. Patent Application SN. 09/541,182 filed April 3,

2000. Other known syntax based processing software may be

used preferably such that it associates the reference

number with respective noun or noun group. Alternately,

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software may be used that simply treats the reference

number as a bilateral link between the drawing segments and

text segments where both include the same reference number.

COMPONENT TEXT ID AND LOCATION

The text of Figure **1A** preferably is semantically

processed by the computer and software, e.g., disclosed in

U.S. Patent Application SN. 09/541,182, filed April 3,

2000, to identify each sentence and each word of the text.

At this stage, each reference number is treated as a

separate word. Accordingly, the text of Figure **1A** is

internally processed into the six sentence, word identified

text of Figure **1B**. The computer stores this data and

identifies various natural language elements including noun

groups. Note the noun groups are identified (highlighted

in Figure **1B**) and each word is identified with a unique

number, such as sentence **2**, word number (**9**), identifies the

reference number "**20**".

DRAWING COMPONENT REFERENCE NUMBER ID AND LOCATION

The present system also recognizes each reference

character on each figure of each sheet of drawings in the

patent. Several standard software products are presently

marketed that provide such capability, e.g. the Fine

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Reader™ software sold by ABBY Software House

http://www.abbyyusa.com/products/fine/index.htm; PenReader™

software sold by Paragon Software

http://www.penreader.com/penreade.htm; and others generally

known to those of ordinary skill in the art. More reliable

results are achieved if the system includes software that

processes graphic data by deleting all data except numbers.

The reference number data and locations can then be more

reliably identified. Accordingly, the patent drawings

(sheets) are processed not only to identify specific

reference characters but also their X – Y grid or pixel

location on specific sheets. If desired, the lead-line

location for each identified reference number can also be

identified. The computer stores this graphic data.

LINKING INDEX

According to the present invention, the text locations

and drawing locations of common reference number components

are linked by the computer for later manipulation and

management. One exemplary system and method for such

linking includes linking the reference number in the text

and its locations with the reference number locations in

the drawings. One way to implement this is for the system

and method to include a linking index, one example of which

is shown in Figure **2A.** Here the patent number (or other

document ID), the drawing component reference number (RN),

sheet number in which the reference number appears and

position on the sheet the reference number appears and the

sentence and word numbers of the reference number are all

stored in association with each other so that user

selection of either the displayed drawing component number

(reference number) or the displayed text segment or text

reference number can, through standard linking techniques,

initiate the display of the other. Further, user selection

of the displayed reference number text segment or the noun

groups in which it is displayed can, through standard

linking techniques, display the full sentence in which the

selected text segment or reference number appears. If

desired or in response to user command, the system displays

the preceding text and subsequent text thereto with the

capability enabling user to scroll forward and backward

through the entire document text, if desired. Although

sentence number and word number are shown, it will be

understood that page number and word number, or word count

number (from word number 1 through word number N, where N

is the last word of the document), or some other word ID

location technique can be used. Also, instead of grid

location, some other suitable reference number location ID

on the drawings can be used, such as vector length/angle
from a predetermined point on the sheet, e.g. upper left
corner of an A4 sheet. Alternately, precise pixel
locations and designations can also be used.

LISTEN/SPEAK COMMANDS

As seen in Figures **3** – **9,** an exemplary system
according to the principles of the present invention can
include a "listen" button and a "speak" button. Selecting
or clicking on either button will activate the respective
mode. The "speak" function (or any other function user
described herein) can be activated by the user <u>speaking</u> a
code word or phrase such as "computer listen" or "computer
speak" or any other desired and pre-stored word or phrase.
Deactivation of the speak or listen function can be
initiated by user repeating the button click or verbal
command or some other pre-stored verbal command such as
"stop speak" or "stop listen" or "plug ears".

Each of these functions provide substantial benefit to
the user because user need not use mouse or keyboard in
order to select one or more reference numbers, noun groups,
or functions of interest. For example, to obtain the data
for Patent No. 5,974,616 shown in Figure **3,** when in the
"listen" mode, user can simply say **"18"** or "computer, **18"**

and the Figure **3** data appears. If user wants more graphic

information, user simply says "zoom out" and greater areas

of the drawing segments appear. If now the user wants to

see all drawing segments that includes a different

reference number, e.g., reference number "**14**", user can

simply say "**14**" or "computer, **14**" and the displayed graphic

is replaced with the respective figures segments with "**14**"

in them which appear along with the text segments/sentences

that includes "**14**". If user says "mouthpiece" the above is

repeated as if user said "**16**" because the index links the

word and the number. As seen below, if user enters or says

a function or action, e.g. "rinse", the system displays or

"speaks" one or all sentences with "rinse" in them.

Also, and independently, if user is viewing graphics

on the monitor and initiates the speak mode then user can

continue to concentrate on the graphics and simply click on

or say "**18**" or "speak **18**" and the computer synthetic voice

shall "speak", in sequence, each sentence or sentence

segment of the entire document text that includes the

reference number "**18**". This mode yields great benefit

because user can concentrate on the graphic content while

<u>listening</u> to each sentence or sentence segment in which

"**18**" appears. In addition, if user wants to listen to

sentences with another reference number, e.g., "**14**", user

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simply says "**14**" or "speak **14**" and the computer then

"speaks" in sequence each sentence or segment that includes

reference number "**14**". If desired, the graphic display can

change to those segments that include "**14**" and user can say

"zoom in", "zoom out" as desired. In addition, user may

want an oral description of text sentences that include

elements, actions, functions, etc. that do not have a

drawing or text reference number, such as "liquid" in U.S.

Patent No. 5,974,616. Thus, according to the inventive

principles, if, when analyzing said patent in the "listen"

mode, user says "speak liquid" then the computer voice

shall "speak" all sentences with "liquid" in them including

the sentence at col. "3", lines "30 – 36" where it

describes "liquid" drains through from chamber "19",

channel "17", etc. Note, "liquid" has no reference number,

but the present method nevertheless promptly speaks and/or

displays the sentences with "liquid" in them for fast user

comprehension of the text/drawing disclosure. Alternately,

if desired, user could type in the word of interest

("liquid") instead of speaking it in the "listen" mode with

the same results.

There are several text-to-speech commercially

available software packages available to implement the

"speak" function in a digital computer, such as IBM's

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VIAVOICE™ software. It can also be used to implement the "listen" commands and verbal commands described above.

With reference to Figure **11** hereof one exemplary method of implementing the speak and stop speak function includes initiating the "speak" and "stop speak" commands **50** by the user, which in the "listen" mode, saying "speak" or "stop speak". In response, the current reference number that had been or shall be selected by the user is acquired at **54**. In response, the sentence segments with the selected reference number are identified at **56** from the index and then acquired in sequence, at **58** and loaded in sequence at **60** to drive a standard synthetic speech module at **62** for driving speaker **64**.

If during the computer "speak" of any particular sentence or segment, user clicks on the expand button **51** or says "expand", then the full sentence before and the full sentence after the current sentence or segment in the text are acquired at **58** and the three full sentences are "spoken" to user in proper order.

EXPAND COMMANDS

User may desire to quickly see or hear the sentence or two before and the sentence including and the sentence or two after a displayed or "spoken" sentence segment. One

example of the present system includes an "expand" button or an expand voice recognition command capability. The system can display these sentences in response to an expand command from user in a number of ways. User can click on a displayed segment to initiate the expand command or click on the "expand" button during the synthetic "speak" of a particular text segment, or when in the "listen" mode, simply say "expand" while the cursor is placed on a segment.

USER DISPLAY AND INTERACTION

In this example, user is interested in quickly understanding patents relating to tooth brushes with <u>sound devices</u>. User can, of course, undertake standard Boolean key word searches of the U.S. Patent & Trademark Office databases to obtain candidate documents for his/her analysis or use any conventional search engine to access candidate patents or use other conventionally on-line engines such as WWW.COBRAIN.COM. [COBRAIN is a registered trademark of Invention Machine Corporation, Boston, MA.] Assume user identified U.S. Patent No. 5,974,616 for analysis. User enters or selects from a displayed list (not shown) the patent number to appear in window **30** on the screen of Figure **1A,** which initiates the processing. The

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system processes the '616 patent and automatically enters data in the linking or table index. See Figure **2A and 2B.** Note only the six sentence text in Figures **1** and **2A** hereof are used in this example. Figure **2** shows the table data for these six sentences. It will be understood that the entire patent should be processed and data entered in the Figure **2A** table, but for simplicity, only the six sentence data is shown. Further detail of one exemplary method of processing patent data into a linking index is shown in Figure **2D.**

Initially windows **34** of Figure **1A** is blank and the full patent text is displayed. In reading the document user sees that "sound chamber shell" is associated with reference number **"18"**. User can click on any **"18"** or highlighted associated noun group or enter **"18"** in window **34** and the system will display in window **38** the text segments in which **"18"** appears and the sheet numbers and figure numbers in which the reference number **"18"** and related component appear see Figure **2B.** User can quickly read the text segment(s) **38** of Figure **3.** If user selects (clicks on) "Figure Number(s)" **40,** then the system will display the relevant figure segments, in this example Fig. **"1", "2", "3",** and **"9"** of the subject patent, in which reference number **"18"** appear. See Figure **3** hereof.

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Alternately, the relevant figure segments including "**18**"
can be displayed along with segments **38** when the drawing
reference number is first selected to display the text
segments.

Preferably, user can zoom out or in to display more or
less drawing information around the reference number "**19**"
component. If user selects "sheet number" **40** a second
time, or alternately gives some other programmed command,
then the system will display the full sheet or all of the
sheet figures with reference number "**18**" in them as in
Figure **5** hereof. The user can enlarge or reduce the
displayed size of the sheet as desired with standard
software techniques. The text segments can be displayed
also as shown in Figure **3** or alternately Figure **8**.

User can also display the full text and one of the
figure segments as in Figure **5** hereof and select an
alternate drawing segment as in Figure **6**, hereof. Lastly,
user can initially select a graphic sheet for display or
later hide the text and scroll the entire drawing sheet as
shown in Figure **7** hereof where sheet no. "1" as selected by
user in the left window to display sheet no. "1" in the
right or graphic window.

As mentioned above, user can select any of the
displayed text segments **38** and the system will display at

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least the full sentence, and preferably more text, in which the segment appears in the text.

User, of course, can select other reference numbers as desired to display the text segment(s) and relevant drawing segments both of which include the selected reference number. It will be understood that the system effectively displays, in a flexible user managed manner integrated document text/graphic subject matter for user's rapid understanding of that subject matter.

For example, assuming the user notices component "19" in the drawings and wants more information about that component, user simply clicks on "19" in any of the figures or enters "19" in window 34. The system, in response, determines from the data in the linking index (data not shown) the text segments and drawing segments associated or linked to reference number "19" and displays all the text segments and all drawing segments that include "19". See Figure 8 which includes the first five segments related to sound chamber "19". In addition, links to the drawing segments (e.g. "Sheet 1, Figure 3" and "Sheet 2, Figure 9") are displayed and, preferably but not necessarily the drawing segments around component "19" are also displayed. See Figure 8 hereof.

It will be understood that the data in Figure **8** would be displayed in a suitable format, such as that shown in Figure **8** or that format shown in Figure **3**, hereof. In either case each text noun group also can function as a link to the full paragraph of text in which the segment appears (see Figure **9**, hereof) and such text would be scrollable in the usual manner. The displayed drawing segment, likewise, function as a link to the full sheet of drawings such that user selection calls up for display the full drawing sheet. See Figure **9**, hereof.

The above method can be repeated for other reference symbols names or drawing components or functions/actions of interest to user, which enable user to manage the integrated text/drawing viewing in an extremely effective and efficient manner.

At anytime during the analysis of the ʻ616 patent, user can enter the "speak" and/or "listen" mode described above. If while in the "listen" mode the Figure **7** information is displayed, and user says "speak **19**" then the computer speaker "speaks", in sequence, each text segment that includes "**19**" while user concentrates on the drawing or drawings being displayed. During the "speak" of anyone segment, user can click on or say "expand" and the sentence before, after, and upon the current segment will be

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"spoken" by the system. In addition, user can say "liquid" and all sentences with the word "liquid" shall be "spoken" by the system. Note "liquid" does not have a reference number and does not appear in the drawings. Nevertheless, user is interested in how the drawing parts function with or relate to "liquid".

If user wishes to end the analysis of Patent 5,974,616, user deletes the patent number from window **30** or enters into window **30** the next patent number for analysis and clicks OK to start the next analysis.

An alternate embodiment mentioned above with little or no semantic or syntactic processing, includes a table or linking index similar to that shown in Figure **2A** but without the column **50** and **52,** and respective data. If without both **50** and **52** data, linking between text and drawing and text selection, would be responsive to reference number selection or designation and not noun group that include the RN selection or designation. The speak/listen commands can also be implemented without **50** and **52** data, if desired.

The above example assumed the document was processed in the user's PC as, EG, in Figure **2B.** The above example also pertains to the system and method in which the document is processed in a centralized or remote server or

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the like accessible to the use (and other users) via networking. See Figure **2C**.

A further exemplary embodiment according to the principles of the present invention is shown in Figures **12** – **15** in which the computer system can generate preferably three windows, a component list window **66,** a graphic window **68,** and a text window **70.** The width or area of these windows on the monitor can be varied as desired by user command in the usual manner, such as dragging a control arrow **72** at the window(s) boundary. One mode of operation and data management of this embodiment includes processing in a remote server a number of patents to generate the linking index as mentioned above.

In this example, the processing server is remotely accessible by user's PC commuter at website http://xyz. The user had previously designated to the server by any suitable conventional method for processing the patents listed at **74** and the server acquired by them on-line and processed and stored these identities and patents in user's file for ready access and analysis. It is assumed for purpose of illustration that all listed patents **74** relates to sound producing toothbrushes and were processed into the full linking indexes similar to Figure **2A** hereof. User then

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opened (clicked on) number 5,974,616 to begin user analysis
of this patent.

The system in response to users patent selection
preferably displayed the component list of each component
which preferably includes a reference number (RN). This
list can be organized in order of RN, as shown in Figure
12, or alternatively in alphabetical order of main noun
word in the component noun group. User can quickly scan the
list and select the component of interest to user, or user
can enter a component word of interest such as "mouthpiece"
in field **75** and click on search button **77**. The system then
displays only those noun groups or components with
"mouthpiece" in them regardless of the appearance or
absence of the respective RN. For example, in the subject
patent, a "mouthpiece" search would produce a component
list as follows:

+ "mouthpiece **16**"

+ "hollow mouthpiece **16**"

+ "all forces driving mouthpiece **16**"

+ "dimensions of mouthpiece **16**"

+ "wind channel **17** of mouthpiece **16**"

+ "cavity **32**, mouthpiece channel **28** and exit port **30**"

User can select (click on) any of these component
entries and the system responds the same as described below

for selecting an entry from the full component list. The

full list can again be displayed by user clicking on

restore button **79**. As mentioned above, if the system is in

the "listen" mode, user can simply say the words "search

(pause) mouthpiece" or "restore" instead of using keyboard

and mouse commands.

In the example shown in Figure **12** user selected

"mouthpiece **16**". In response the system displays the text

segment in window **70** that includes the first occurrence of

"mouthpiece **16**" and preferably positions the sentence

including that specific noun group in the center of the

window, and also preferably highlights the selected noun

group (component). This enables the user to quickly find

the selected component in the text and to read the text

that comes before and after the selected component noun

group. In addition, scroll control slide button **76** enables

user to scroll fore and aft throughout the entire text, if

desired. In addition, the system identifies all the other

components identified in the linking index such as by

underlining them or displaying them in a distinct color

from all other text.

The system can also automatically display the graphic

segment of the first sheet of drawings that includes the

reference number "**16**" as shown in Figure **12** window **68**. The

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graphic segment can be displayed in response to user selection of the component in window **66** and/or user selection (click on) of the component in the text in window **70**. Figure **12** shows the situation in which user clicked on component "**16**" either in window **66** or the window **70**. User can scroll through the displayed drawing sheet with the use of right-left, up-down slide buttons **78** and **80,** as desired. The system also identifies for user convenience all the RN's in the displayed graphic that appears in the linking index by showing them in a distinctive color or by placing a circle or black square about them in the graphic. Since "**16**" is part of the component selected by user to display the segment shown in window **68** Figure **12,** the system highlights "**16**" in the graphic by, for example, placing a red square around it in the graphic.

Because the system stores the linking data among all occurrences of the RNs, the system enables user to jump to various sentences of the text in which any selected RN appears. For example, user can click on (select) "**16**" in Figure **12** window **68** and in response the system displays the small sub-window **82** in which the system displays all the noun groups throughout the text that include RN "**16**". The system enables user to listen to any of the sentences that include the respective noun group listed in sub-window **82**

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in response to user selecting (clicking on) the speaker icon **83** at the end of the noun group of interest. Sub-window **83** can be moved by user by standard click-and-drag routines as desired.

The system enables user to select any one of the listed noun groups in sub-window **82** by clicking on the specific noun group to initiate the new text display of the respective text segment that includes that specific noun group selected. For example, if user selects "wind channel **17** of mouthpiece **16**" in window **82** of Figure **13,** then the system will immediately display the text shown in window **70** of Figure **14.** If user, in reading this text, becomes interested in "port **21**", user can see it is highlighted and, therefore, can select it to display immediately sub-window **84** that lists all sheets of drawings that include "**21**". User can select the desired sheet number by clicking on it in window **84** and the graphic in window **68** immediately changes to that shown in Figure **15** with component "**21**" preferably in the center of the window, a red square around "**21**", and a light black square around "**16**" because now "**21**" was selected by the user. See Figure **15.**

It will be understood that the system enables user to quickly access the graphic and text segments of interest to user, to quickly jump to new areas of text and new areas of

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graphics of interest to user in a user controlled, text-graphic integrated manner for the rapid understanding and managing of the document data segments displayed on the monitor. In addition, user can print in color any screen shot desired through standard word processing programs such as Microsoft Word, etc. In addition, the system can include the zoom in-out features and the "speak" and "listen" features mentioned above, as desired.

Sub-Windows **82** and **84** can be closed in any suitable manner, such as by moving the curser across the "close" word in the title bar. They can be placed in any suitable location on the monitor and need not cover the any portion of the graphic segment or text segment, if desired. Alternately, they can be located within the component list window **66** after user accesses a text and a graphic segment or some other suitable location in the display.

It will be understood that besides patent documents, various other types of natural language and graphic documents can be analyzed according to the present invention, such as (without limitation) technical articles with graphics having certain parts labeled, medical, financial, and business documents with body parts, graphs, charts, tables with segments labeled, etc. These labels (e.g. words) would be used as and function as reference

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symbols (RS), the same as the patent reference numbers (RNs) mentioned above to integrate the text and graphic analysis.

It will also be understood that various features and functions disclosed herein can be employed in various combinations and/or be implemented under the control and selection of the user and that the present invention is not limited to the precise exemplary steps disclosed herein for user management of displayed information. For example, instead of a speak icon in sub-window **82,** the system can be programmed to speak the sentence in response to the first click on a particular component and display the new text segment in window **70** in response to the second click of such component.

GLOSSARY

Graphics segment – a portion of a graphic that includes an RS.

Index or Linking Index – computer resident data bases and/or files and routines that associate or cross link information such as described in Figure **2A** hereof.

Intersection – where a graphic segment and text segment include a common RS.

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Noun group – a word or group of words that include a component name associated with an RS. The noun group may or may not include the RS so long as one occurrence in the text includes the RS.

Normalizing/group component names – changing nouns to a standard term (such as "mouthpieces" to "mouthpiece" or "entire toothbrush 10" to "toothbrush 10") and grouping several occurrences of a term into a master term with links to the specific terms.

Quotation marks ("x") – RN and Figure numbers in U.S. Patent No. 5,974,616.

Reference Number (RN) – an RS that includes a number

Reference Symbol (RS) – letter(s), word(s), number(s) or combination thereof that are used to designate a feature, component, or item in a document text and/or graphic.

Selection of RS – user selection (e.g., click on) of a displayed RS or a noun group associated with such RS or user voice recognition command and word.

"Sheet # 0" – the cover sheet for the patent as distinct from a full sheet of drawings in, for example, a US Patent.

Sub-window – a pop-up small window.

Table or linking table – linking index.

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Text segment – a group of words from at least part of

a sentence which may or may not include an RS.